

CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE EAST FORK CLARK'S RIVER WATERSHED

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5.1. BACKGROUND. The Watershed Approach relies on participation at the federal, state, local and nongovernmental levels to be successful. Two types of partnerships are critical to ensure success:

- Partnerships between agencies
- Partnerships between agencies and landowners

This chapter describes both types of partnerships in the Tennessee portion of the East Fork Clark's River Watershed. The information presented is provided by the agencies and organizations described.

5.2. FEDERAL PARTNERSHIPS.

5.2.A. Natural Resources Conservation Service. The Natural Resources Conservation Service (NRCS), an agency of the U.S. Department of Agriculture, provides technical assistance, information, and advice to citizens in their efforts to conserve soil, water, plant, animal, and air resources on private lands.

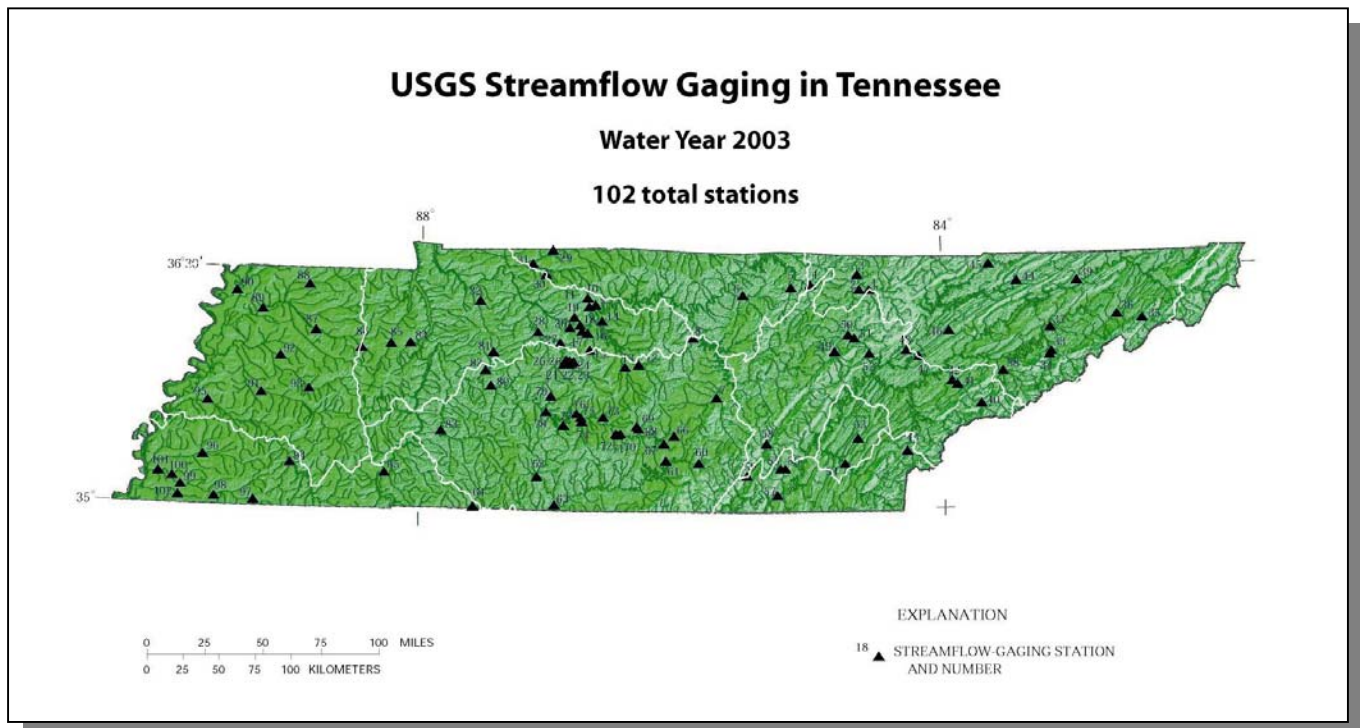
Performance Results System (PRS) is a Web-based database application providing USDA Natural Resources Conservation Service, conservation partners, and the public fast and easy access to accomplishments and progress toward strategies and performance. The PRS may be viewed at <http://prms.nrcs.usda.gov/prs>. From the opening menu, select "Reports" in the top tool bar. Next, select "2004 Reports" if it's active, and "2003 PRMS Reports" if it's not. Pick the conservation treatment of interest on the page that comes up and reset the date to 2004 Reports if it is not set there. Pick the conservation practice of interest. In the location drop box of the page that comes up, select "Tennessee" and click on the "Refresh" button. In the "By" drop box that comes up, select "Hydrologic Unit" and click on the "Refresh" button. The report of interest can now be viewed.

The data can be used to determine broad distribution trends in service provided to customers by NRCS conservation partnerships. These data do not show sufficient detail to enable evaluation of site-specific conditions (e.g., privately-owned farms and ranches) and are intended to reflect general trends.

5.2.B. United States Geological Survey Water Resources Programs – Tennessee District The U.S. Geological Survey (USGS) provides relevant and objective scientific studies and information for public use to evaluate the quantity, quality, and use of the Nation's water resources. In addition to providing National assessments, the USGS also conducts hydrologic studies in cooperation with numerous Federal, State, and local agencies to address issues of National, regional, and local concern. Please visit <http://water.usgs.gov/> for an overview of the USGS, Water Resources Discipline.

The USGS collects hydrologic data to document current conditions and provide a basis for understanding hydrologic systems and solving hydrologic problems. In Tennessee, the USGS records streamflow continuously at more than 102 gaging stations equipped with recorders and makes instantaneous measurements of streamflow at many other locations. Ground-water levels are monitored Statewide, and the physical, chemical, and biologic characteristics of surface and ground waters are analyzed. USGS activities also include the annual compilation of water-use records and collection of data for National baseline and water-quality networks. National programs conducted by the USGS include the National Atmospheric Deposition Program (<http://bqs.usgs.gov/acidrain/>), National Stream Quality Accounting Network (<http://water.usgs.gov/nasqan/>), and the National Water-Quality Assessment Program (<http://water.usgs.gov/nawqa/>). For specific information on the Upper and Lower Tennessee NAWQA studies, please visit <http://tn.water.usgs.gov/iten/tenn.html>

USGS Water Resources Information on the Internet. Real-time and historical streamflow, water levels, and water-quality data at sites operated by the Tennessee District can be accessed at <http://waterdata.usgs.gov/tn/nwis/nwis>. Data can be retrieved by county, hydrologic unit code, or major river basin using drop-down menus. Contact Donna Flohr at (615) 837-4730 or dfflohr@usgs.gov for specific information about streamflow data. Recent publications by the USGS staff in Tennessee can be accessed by visiting <http://tn.water.usgs.gov/pubpg.html>. This web page provides searchable bibliographic information to locate reports and other products about specific areas.



5.2.C. U.S. Fish and Wildlife Service. The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. Sustaining our nation's fish and wildlife resources is a task that can be accomplished only through the combined efforts of governments, businesses, and private citizens. The U.S. Fish and Wildlife Service (Service) works with State and Federal agencies and Tribal governments, helps corporate and private landowners conserve habitat, and cooperates with other nations to halt illegal wildlife trade. The Service also administers a Federal Aid program that distributes funds annually to States for fish and wildlife restoration, boating access, hunter education, and related projects across America. The funds come from Federal excise taxes on fishing, hunting, and boating equipment.

Endangered Species Program

Through the Endangered Species Program, the Service consults with other federal agencies concerning their program activities and their effects on endangered and threatened species. Other Service activities under the Endangered Species Program include the listing of rare species under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended: 16 U.S.C. 1531 et seq.) and the recovery of listed species. Once listed, a species is afforded the full range of protections available under the ESA, including prohibitions on killing, harming or otherwise taking a species. In some instances, species listing can be avoided by the development of Candidate Conservation Agreements, which may remove threats facing the candidate species, and funding efforts such as the Private Stewardship Grant Program. For a complete listing of endangered and threatened species in Tennessee, please visit the Service's website at <http://www.fws.gov/cookeville/>.

Recovery is the process by which the decline of an endangered or threatened species is stopped and reversed, and threats to the species' survival are eliminated, so that long-term survival in nature can be ensured. The goal of the recovery process is to restore listed species to a point where they are secure and self-sustaining in the wild and can be removed from the endangered species list. Under the ESA, the Service and National Marine Fisheries Service were delegated the responsibility of carrying out the recovery program for all listed species.

In a partnership with the Tennessee Nature Conservancy (TNC), Tennessee Wildlife Resources Agency (TWRA), and Tennessee Department of Environment and Conservation (TDEC) Division of Natural Heritage, the Service developed a State Conservation Agreement for Cave Dependent Species in Tennessee (SCA). The SCA targets unlisted but rare species and protects these species through a suite of proactive conservation agreements. The goal is to preclude the need to list these species under the ESA. This agreement covers middle and eastern Tennessee and will benefit water quality in many watersheds within the State.

In an effort to preclude the listing of a rare species, the Service engages in proactive conservation efforts for unlisted species. The program covers not only formal candidates but other rare species that are under threat. Early intervention preserves management options and minimizes the cost of recovery.

Partners for Fish and Wildlife Program

The U.S. Fish and Wildlife Service established the Partners for Fish and Wildlife Program to restore historic habitat types that benefit native fishes and wildlife. The program adheres to the concept that restoring or enhancing habitats such as wetlands or other unique habitat types will substantially benefit federal trust species on private lands by providing food and cover or other essential needs. Federal trust species include threatened and endangered species, as well as migratory birds (e.g. waterfowl, wading birds, shorebirds, neotropical migratory songbirds).

Participation is voluntary and various types of projects are available. Projects include livestock exclusion fencing, alternate water supply construction, streambank

stabilization, restoration of native vegetation, wetland restoration/enhancement, riparian zone reforestation, and restoration of in-stream aquatic habitats.

HOW TO PARTICIPATE

- Interested landowners contact a Partners for Fish and Wildlife Biologist to discuss the proposed project and establish a site visit.
- A visit to the site is then used to determine which activities the landowner desires and how those activities will enhance habitat for trust resources. Technical advice on proposed activities is provided by the Service, as appropriate.
- Proposed cost estimates are discussed by the Service and landowner.
- A detailed proposal which describes the proposed activities is developed by the Service biologist and the landowner. Funds are competitive, therefore the proposal is submitted to the Service's Ecosystem team for ranking and then to the Regional Office for funding.
- After funding is approved, the landowner and the Service co-sign a Wildlife Extension Agreement (minimum 10-year duration).
- Project installation begins.
- When the project is completed, the Service reimburses the landowner after receipts and other documentation are submitted according to the Wildlife Extension Agreement.

For more information regarding the Endangered Species and Partners for Fish and Wildlife programs, please contact the Tennessee Ecological Services Field Office at (931)-528-6481 or visit their website at <http://www.fws.gov/cookeville/>

5.2.D. Tennessee Valley Authority (TVA). The Tennessee Valley Authority's (TVA) goals for the 21st Century are to generate prosperity for the Tennessee Valley by promoting economic development, supplying low-cost, reliable power, and supporting a thriving river system. TVA is committed to the sustainable development of the region and is engaged in a wide range of watershed protection activities. TVA has seven multidisciplinary Watershed Teams to help communities across the Tennessee Valley actively develop and implement protection and restoration activities in their local watersheds. These teams work in partnership with business, industry, government agencies, and community groups to manage, protect, and improve the quality of the Tennessee River and its tributaries. TVA also operates a comprehensive monitoring program to provide real-time information to the Watershed Teams and other entities about the conditions of these resources.

Further information on TVA's activities in the Tennessee Western valley (KY Lake) Watershed can be obtained by writing the Kentucky Watershed Team at 202 West Blythe St., Paris, TN 38242 or by calling (731)-641-2000.

5.3. STATE PARTNERSHIPS.

5.3.A. TDEC Division of Water Supply. The Source Water Protection Program, authorized by the 1996 Amendments to the Safe Drinking Water Act, outline a comprehensive plan to achieve maximum public health protection. According to the plan, it is essential that every community take these six steps:

- 1) Delineate the drinking water source protection area
- 2) Inventory known and potential sources of contamination within these areas
- 3) Determine the susceptibility of the water supply system to these contaminants
- 4) Notify and involve the public about threats identified in the contaminant source inventory and what they mean to their public water system
- 5) Implement management measures to prevent, reduce or eliminate threats
- 6) Develop contingency planning strategies to deal with water supply contamination or service interruption emergencies (including natural disaster or terrorist activities).

Source water protection has a simple objective: to prevent the pollution of the lakes, rivers, streams, and ground water (wells and springs) that serve as sources of drinking water before they become contaminated. This objective requires locating and addressing potential sources of contamination to these water supplies. There is a growing recognition that effective drinking water system management includes addressing the quality and protection of the water sources.

Source Water Protection has a significant link with the Watershed Management Program goals, objectives and management strategies. Watershed Management looks at the health of the watershed as a whole in areas of discharge permitting, monitoring and protection. That same protection is important to protecting drinking water as well. Communication and coordination with a multitude of agencies is the most critical factor in the success of both Watershed Management and Source Water Protection.

Watershed management plays a role in the protection of both ground water and surface water systems. Watershed Management is particularly important in areas with karst (limestone characterized by solution features such as caves and sinkholes as well as disappearing streams and spring), since the differentiation between ground water and surface water is sometimes nearly impossible. What is surface water can become ground water in the distance of a few feet and vice versa.

Source water protection is not a new concept, but an expansion of existing wellhead protection measures for public water systems relying on ground water to now include surface water. This approach became a national priority, backed by federal funding, when the Safe Drinking Water Act amendments (SDWA) of 1996 were enacted. Under this Act, every public drinking water system in the country is scheduled to receive an assessment of both the sources of potential contamination to its water source of the threat these sources may pose by the year 2003 (extensions were available until 2004). The assessments are intended to enhance the protection of drinking water supplies within existing programs at the federal, state and local levels. Source water

assessments were mandated and funded by Congress. Source water protection will be left up to the individual states and local governments without additional authority from Congress for that progression.

As a part of the Source Water Assessment Program, public water systems are evaluated for their susceptibility to contamination. These individual source water assessments with susceptibility analyses are available to the public at <http://www.state.tn.us/environment/dws> as well as other information regarding the Source Water Assessment Program and public water systems.

For further discussion on ground water issues in Tennessee, the reader is referred to the Ground Water Section of the 305(b) Water Quality Report at:

<http://www.state.tn.us/environment/water.htm>.

The intent of this report is to provide the public with an overall characterization of ground water quality and hydrogeology for Tennessee.

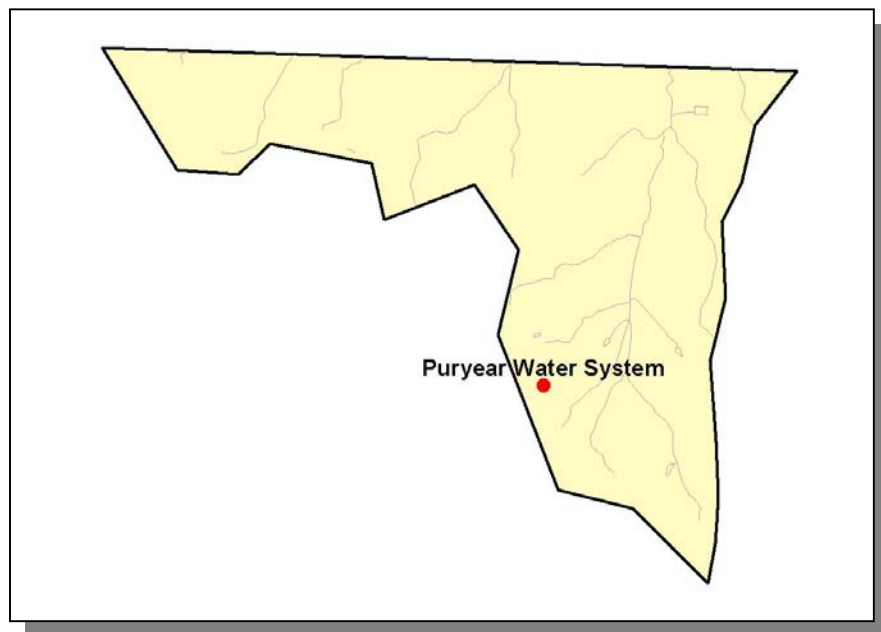


Figure 5-1. Locations of Community and Public Groundwater Supply Intakes in the Tennessee Portion of the East Fork Clark's River Watershed.

5.3.B. Tennessee Department of Agriculture. The Tennessee Department of Agriculture's Water Resources Section consists of the federal Section 319 Nonpoint Source Program and the Agricultural Resources Conservation Fund Program. Both of these are grant programs which award funds to various agencies, non-profit organizations, and universities that undertake projects to improve the quality of Tennessee's waters and/or educate citizens about the many problems and solutions to water pollution. Both programs fund projects associated with what is commonly known as "nonpoint source pollution."

The Tennessee Department of Agriculture's Nonpoint Source Program (TDA-NPS) has the responsibility for management of the federal Nonpoint Source Program, funded by the US Environmental Protection Agency through the authority of Section 319 of the Clean Water Act. This program was created in 1987 as part of the reauthorization of the Clean Water Act, and it established funding for states, territories and Indian tribes to address NPS pollution. Nonpoint source funding is used for installing Best Management Practices (BMPs) to stop known sources of NPS pollution, training, education, demonstrations and water quality monitoring. The TDA-NPS Program is a non-regulatory program, promoting voluntary, incentive-based solutions to NPS problems. The TDA-NPS Program basically funds three types of programs:

- **BMP Implementation Projects.** These projects aid in the improvement of an impaired waterbody, or prevent a non-impaired water from becoming listed on the 303(d) List.
- **Monitoring Projects.** Up to 20% of the available grant funds are used to assist the water quality monitoring efforts in Tennessee streams, both in the state's 5-year watershed monitoring program, and also in performing before-and-after BMP installation, so that water quality improvements can be verified.
- **Educational Projects.** The intent of educational projects funded through TDA-NPS is to raise the awareness of landowners and other citizens about practical actions that can be taken to eliminate nonpoint sources of pollution to the waters of Tennessee.

The Tennessee Department of Agriculture Agricultural Resources Conservation Fund Program (TDA-ARCF) provides cost-share assistance to landowners across Tennessee to install BMPs that eliminate agricultural nonpoint source pollution. This assistance is provided through Soil Conservation Districts, Resource Conservation and Development Districts, Watershed Districts, universities, and other groups. Additionally, a portion of the TDA-ARCF is used to implement information and education projects statewide, with the focus on landowners, producers, and managers of Tennessee farms and forests.

Participating contractors in the program are encouraged to develop a watershed emphasis for their individual areas of responsibility, focusing on waters listed on the Tennessee 303(d) List as being impaired by agriculture. Current guidelines for the TDA-ARCF are available. Landowners can receive up to 75% of the cost of the BMP as a reimbursement.

Since January of 1999, the Department of Agriculture and the Department of Environment and Conservation have had a Memorandum of Agreement whereby complaints received by TDEC concerning agriculture or silviculture projects would be forwarded to TDA for investigation and possible correction. Should TDA be unable to obtain correction, they would assist TDEC in the enforcement against the violator. More information forestry BMPs is available at: <http://tennessee.gov/agriculture/forestry/BMPs.pdf>, and the complaint form is available at: <http://tennessee.gov/environment/wpc/logform.php>.

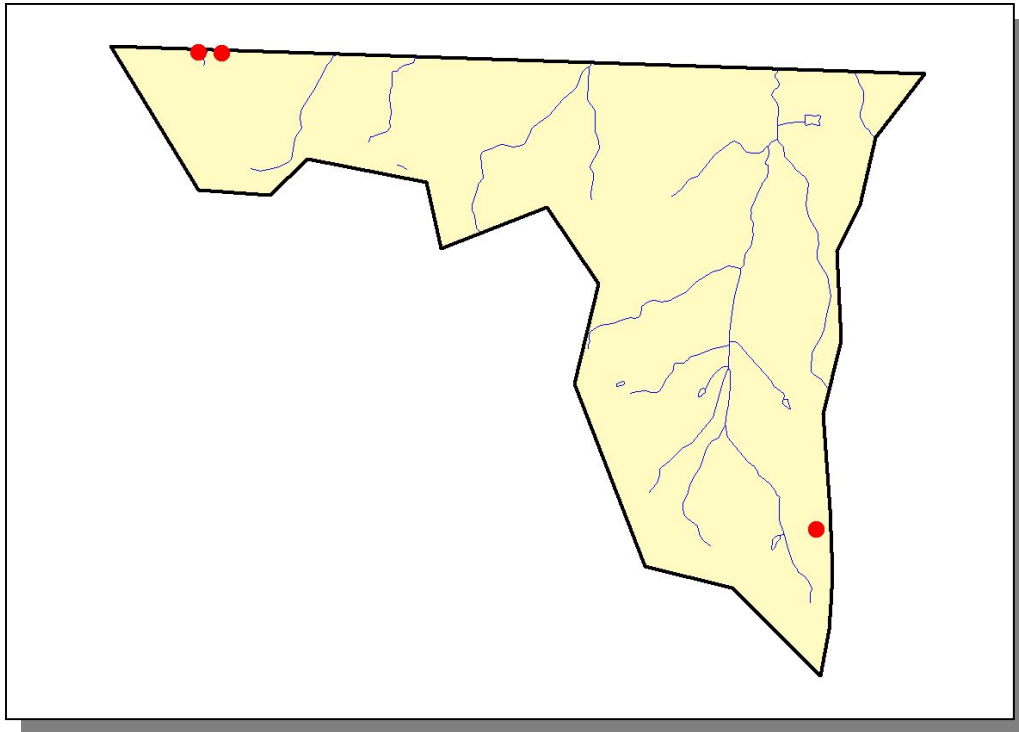


Figure 5-2. Location of BMPs installed from 1999 through 2003 in the Tennessee Portion of the East Fork Clark's River Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs. More information is provided in Appendix V.

5.3.C. Kentucky Division of Water. The Kentucky Watershed Management Framework is a dynamic, flexible structure for coordinating watershed management across the Commonwealth of Kentucky. The Watershed Management Framework is not a new program, but rather a way of coordinating existing programs and building new partnerships that will result in more effective and efficient management of the state's land and water resources. Inherent in the design of the Framework is the belief that many stakeholder groups and individuals must have ongoing opportunities to participate

in the process of managing the abundant natural resources that characterize Kentucky's watersheds.

Benefits to the people of Kentucky include:

- Better information for decision making
- Increased ability to resolve complex water resources problems
- Improved coordination among government agencies
- More opportunities for citizens to get involved
- Increased ability to demonstrate results and benefits of environmental management
- More cost effective use of public and private funds

Each major river basin in Kentucky is staffed with a Basin Coordinator. Basin Coordinators are staff assigned to serve as a liaison in a given basin management unit among the agencies, the local interests, and the resources concerns. Their job is to specialize in their watershed, to know what resources might be available to address the concerns, and facilitate the watershed process to implement plans that address the problems.

For more information about the KY Watershed Management Framework visit our website at <http://www.watersheds.ky.gov/>

Watershed Framework activities in the Clark's River Watershed are coordinated through the Four Rivers Basin Team. The Four River Basin Team is a multi-agency task force that meets regularly to help in development of monitoring strategies, education and outreach, prioritization of issues and watersheds within the basin, planning, and networking among technical staff and local leaders to apply agency resources to implement fixes. For more info about the Four Rivers Basin Team contact:

Bob Wise
Four Rivers Basin Coordinator
(270)-554-1022
robert.wise@jpf.org.

The web address is http://www.watersheds.ky.gov/basins/four_rivers/

The Clark's River was one of three HUC 11 watersheds identified by the Four River's Basin Team as a priority watershed for watershed planning in the first cycle of the KY Watershed Management Framework. The Basin Team recently applied for 319h funding thru KY's Nonpoint Source Pollution program to develop a Watershed Based Plan for a portion of the watershed. The area affected would be in the upper portion of the watershed from about Murray, KY upstream to the headwaters in Tennessee.

There are a number of other federal and state agency projects in the watershed including the Clark's River National Wildlife Refuge.

The Clarks River arises in Henry County, Tennessee and flows north through Calloway, Marshall and McCracken Counties in Kentucky before reaching the Tennessee River near Paducah. The watershed terrain has wide valleys rising to ridges that are mostly wide but occasionally narrow. Elevations vary 150 feet or less between valleys and ridge tops. The ridges are underlain by unconsolidated Mesozoic and Cenozoic sand, gravel and clay. The valley bottoms are underlain by Quaternary alluvium.

Waterways. This watershed drains over 303 square miles and contains about 888 total stream miles. The major tributary is the West Fork of the Clarks River, which is discussed as a separate hydrologic unit. Smaller tributaries include Middle Fork of Clarks River, Clayton Creek, Bee Creek, Rockhouse Creek, Wades Creek, East Fork of Clarks River, Ellison Creek, Beaverdam Slough, Elizabeth Creek, Middle Fork Creek, Chestnut Creek, Lick Creek, Elender Creek and numerous others. In many places the stream is split into multiple channels. There are several small impoundments on the tributaries but none on the main stem. Wastewater facilities discharge effluent into the Clarks River at Murray, Hardin and Benton. There are 17 active KPDES permits recorded for this watershed including wastewater facilities at Benton, Murray and Hardin.

Land cover/land use. The watershed is dominated by agricultural production of row crops, poultry and beef cattle. Large residential areas have been developed around the cities of Murray, Benton, Reidland and Paducah. Commercial and industrial developments also exist in and around these cities. Downstream of Highway 80 there are large tracts of wetlands along the main stem of the Clarks River. Much of this wetland area lies within the 18,000-acre Clarks River National Wildlife Refuge project boundary. Currently the US Fish and Wildlife Service owns about 8,000 acres inside the refuge boundary. There are scattered areas of deciduous forest areas along ridges and around the wetlands. There are three surface mine quarries in the watershed. There are two active state Superfund sites near the city of Murray.

Agency Data Assessment. During the 2000 water quality assessment the Clarks River watershed was officially assessed in 22 segments for a total of 74.3 miles. The main stem of the Clarks River was assessed in 8 eight segments. A 7.7-mile segment below the West Fork was assessed for fish and was judged partially supporting for aquatic life. Five segments upstream of the West Fork assessed for a total of 27.1 miles. All of these segments were judged fully supporting for aquatic life, primary contact recreation and fish consumption. A 2.6-mile segment from milepoint 58.3 up to the Middle Fork of the Clarks River was assessed for fish and fecal coliform bacteria. This segment was judged partially supporting for aquatic life and primary contact recreation.

Two segments of the Middle Fork of Clarks River were assessed for a total of 4.9 miles. A 2.7-mile segment from the mouth up to Fraley Branch was assessed for fish, macroinvertebrates and fecal coliform bacteria. The segment was judged partially supporting for aquatic life and not supporting for primary contact recreation. The next segment is from Fraley Branch upstream 2.2 miles to an unnamed tributary. This segment was assessed for macroinvertebrates and was judged partially supporting for aquatic life.

Two segments of the East Fork of Clarks River were assessed for a total of 3.7 miles. A 2.7-mile segment from the mouth to a point upstream was assessed for fish and macroinvertebrates and was judged fully supporting. A one mile segment below the

South 641 sewage treatment plant was assessed using Discharge Monitoring Report data and was judged partially supporting for primary contact recreation.

Two segments of Clayton Creek were assessed for a total of 6.3 miles. A 2.5-mile segment from East Fork up to an unnamed tributary was assessed for macroinvertebrates and was judged partially supporting for aquatic life. An aquatic and riparian habitat survey yielded a score in the partially supporting range due to poor bank stability and sediment deposition. The remaining 3.8 miles upstream were assessed for fecal coliform bacteria and were judged not supporting for primary contact recreation.

- A 6.4-mile segment of Middle Fork Creek from Burkholder Deadening up to the reservoir was assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged partially supporting for aquatic life and not supporting for primary contact recreation. An aquatic and riparian habitat survey yielded a score in the not supporting range due to poor bank stability and heavy sediment deposition.
- A 3.0-mile segment of Chestnut Creek from the mouth up to the reservoir was assessed for macroinvertebrates and fecal coliform bacteria. This segment was judged partially supporting for aquatic life and primary contact recreation. An aquatic and riparian habitat survey yielded a score in the not supporting range due to poor riparian vegetation, poor bank stability and sediment deposition.
- A 4.9-mile segment of Rockhouse Creek was assessed for fish and macroinvertebrates. This segment was judged fully supporting for aquatic life.
- A 3.8-mile segment of Wades Creek was assessed for fish and macroinvertebrates. This segment was judged fully supporting for aquatic life.
- A 1.8-mile segment of Bee Creek was assessed for fecal coliform bacteria and was judged not supporting for primary contact recreation.
- A 0.5-mile segment of an unnamed tributary to Old Beaver Dam Slough was assessed for macroinvertebrates and was judged not supporting for aquatic life.
- A 0.9-mile segment of Martin Creek was assessed using Discharge Monitoring Report (DMR) data from Hardin sewage treatment plant. The segment was judged partially supporting for aquatic life and primary contact recreation.
- A 0.7-mile segment of an unnamed tributary to Chestnut Creek was assessed using Discharge Monitoring Report (DMRs) data from Draffenville sewage treatment plant. The segment was judged partially supporting for aquatic life and primary contact recreation.

Watershed Ranking. The data-driven ranking process for the 4 Rivers region unit indicated the watershed as an overall high priority with a high need for restoration and a very high concern for potential impacts. The main factor driving the need for restoration is observed impacts that indicate 50.3 miles of streams are impaired for their designated use. There are also a very high number of contamination sites in the watershed.

Potential impact factors include a high number of KDPEs discharges, a high potential for erosion from agricultural practices, a very high number of potential contamination sites and a very high number of discharge violations.

Other Data. A stream flow gauge is maintained on the Clarks River near the community of Almo.

West Fork of the Clarks River (06040006050)

Geography. The West Fork of the Clarks River arises in west central Calloway County and flows generally northward through Marshall and Graves Counties before entering McCracken County where it meets the Clarks River. The watershed terrain has wide valleys rising to ridges that are mostly wide but occasionally narrow. The most rugged areas exist between Highway 212 and Highway 58/80. Elevations vary 150 feet or less between valleys and ridge tops. The ridges are underlain by unconsolidated Mesozoic and Cenozoic sand, gravel and clay. The valley bottoms are underlain by Quaternary alluvium.

Waterways. This watershed drains over 222 square miles and contains about 691 total stream miles. Tributaries include Darnell Creek, Sand Lick Branch, Watson Creek, Edwards Creek, Damon Creek, Duncan Creek, Soldier Creek, Panther Creek, Trace Creek, Spring Creek, Tucker Creek, Sugar Creek, Hodge Creek, Bear Creek and Camp Creek. There are several small impoundments on tributaries but none on the main stem. A significant stretch of the West Fork has been straightened to improve drainage. This section is located between Highway 58/80 and Highway 348. As a result the stream is split into multiple channels along much of this stretch. There are 6 KPDES permits recorded for this watershed, including the Murray Landfill and Symsonia wastewater treatment facility.

Land cover/land use. The watershed is dominated by agricultural production of row crops, poultry, swine, dairy and beef cattle. Deciduous forest remains on the more rugged terrain in the central portion of the watershed. There are extensive wetlands around the main stem of the West Fork, downstream of the Purchase Parkway. Included in this area is the 1700 acre Kaler Bottoms Wildlife Management Area. The Murray landfill is located in the upper portion of the watershed near Coldwater. There are two surface mine quarries located in the watershed. There are no significant residential, industrial or commercial developments in this watershed.

Agency Data Assessment

During the 2000 water quality assessment the main stem of the West Fork of the Clarks River was assessed in six segments for a total of 22.1 miles. A 7.5-mile segment was assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged fully supporting for aquatic life but only partially supporting for primary contact recreation. A 4.0-mile segment below Panther Creek was assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged fully supporting for aquatic life but not supporting for primary contact recreation. A 2.9-mile segment between Panther Creek and Soldier Creek was assessed for macroinvertebrates and was judged fully supporting for aquatic life. A 3.0-mile segment between Soldier Creek and Duncan Creek was assessed for fish, macroinvertebrates, algae and fish tissue. The segment was judged

fully supporting for aquatic life but only partially supporting for fish tissue consumption. A 4.6-mile segment from Duncan Creek to Watson Creek was assessed for fecal coliform bacteria and was judged partially supporting for aquatic life. A 4.1-mile segment from Darnell Creek up to the headwaters was assessed for macroinvertebrates and was judged partially supporting for aquatic life. A 13.8-mile segment of a channelized section of the West Fork was assessed for fish and was judged partially supporting for aquatic life.

The lower 3.7 miles of Blizzard Pond was assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged not supporting for primary contact recreation, but the macroinvertebrate data was judged inconclusive for support of aquatic life. A 1.0-mile segment below Great Oaks Subdivision sewage treatment plant was assessed using discharge monitoring reports (DMRs). The segment was judged partially supporting for aquatic life and primary contact recreation.

- A 5.4-mile segment of Camp Creek was assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged partially supporting for both aquatic life and primary contact recreation.
- A 1.8-mile segment of Duncan Creek below a reservoir was assessed for macroinvertebrates and fecal coliform bacteria. The segment was judged not supporting for aquatic life, but fecal coliform data collected was inconclusive for support of primary contact recreation. This stream will be revisited during the next monitoring cycle.
- A 1.8-mile segment of Spring Creek was assessed for fish and was judged partially supporting for aquatic life.
- A 0.3-mile segment Reeves Branch was assessed for macroinvertebrates and was judged partially supporting for aquatic life.
- The tributaries of Duncan Creek, Panther Creek, Pryor Branch, Soldier Creek, Sugar Creek and Trace Creek were assessed and judged fully supporting for aquatic life. Panther Creek was also determined to be fully supporting for primary contact recreation.

Watershed Rankings. The data-driven ranking process for the 4 Rivers region indicated the watershed as an overall medium priority.

Cypress Creek (06040006020)

Geography. Cypress Creek arises in central Marshall County and flows north to Gilbertsville where it turns to the west and flows into the Tennessee River. Upstream of Highway 62 the terrain is fairly rugged with wide valleys that rise 50-100 feet to narrow ridges. Downstream of Highway 62 the terrain becomes more gently rolling with elevation variances of less than 50 feet.

Waterways. This watershed drains about 61 square miles and contains about 192 total stream miles. Tributaries include Bloodyshin Branch, Stice Creek, Little John Creek,

Camp Creek and Little Cypress Creek. There is a large wetland area along the upper portion of the main stem as well as some smaller wetlands in the lower portion. There are 18 active KPDES permits recorded for this watershed.

Land cover/land use. Industrial and commercial are the major land uses in the watershed, especially around Calvert City. There are 5 active state Superfund sites located at Calvert City. Commercial areas are also located along the Highway 68, Highway 62 and Interstate 24 corridors. There are 3 small surface mines for sand, gravel or clay. There is some agriculture production including row crops and a couple of large poultry operation. Residential areas are located at Gilbertsville, Calvert City and along the highway corridors. There are wooded areas around the wetlands and on the more rugged ridges.

Agency Data Assessment. During the 2000 water quality assessment the main stem of Cypress Creek was assessed in two segments for a total of 7.0 miles. The lower segment was assessed for water quality and fecal coliform bacteria. This segment was judged fully supporting for aquatic life and primary contact recreation. The upper segment is located above Camp Creek and was assessed for macroinvertebrates. This segment was judged not supporting for aquatic life.

Little Cypress Creek was assessed in two segments for a total of 6.0 miles. The lower segment was assessed for macroinvertebrates and fecal coliform bacteria. This segment was judged partially supporting for primary contact recreation and not supporting for aquatic life. The upper segment was assessed for macroinvertebrates and was judged not supporting for aquatic life.

A 0.7-mile segment of Angle Creek, from the mouth up to Barrett Creek, was assessed for macroinvertebrates and fecal coliform bacteria. This segment was judged partially supporting for aquatic life and not supporting for primary contact recreation.

Watershed Rankings. The data-driven ranking process for the 4 Rivers region indicated the watershed as an overall high priority due to a high need for restoration, protection and a high concern for potential impacts. The main factor for restoration is observed impacts that indicate 8.1 miles of streams not fully supporting their designated uses. The main factor for protection is the watershed's location within the Paducah source water protection area. Potential impacts include a high number of permitted discharges and a high toxic release inventory score.

Tennessee River, Below Cooper Creek (06040006010)

Geography. This hydrologic unit represents the Tennessee River from a small tributary just below Kentucky Dam downstream to the mouth of the Clarks River. The eastern side of the watershed drains an area known as "the land between the rivers" because it is located between the Cumberland and Tennessee Rivers. The upper portion of this area around Guess Creek is rugged with narrow valleys that rise quickly 100-200 feet to narrow ridges. The lower portion is less rugged and resembles the western side of the watershed. This area has gradual slopes that vary less than 50 feet between the river valley and wide ridge tops.

Waterways. This hydrologic unit drains about 56 square miles and contains about 170 total stream miles. Tributaries include Guess Creek, Yancy Creek, Lee Creek, Mud Creek and Oak Creek. Cypress Creek is a major tributary to this segment and is discussed as a separate hydrologic unit. The Tennessee River from Kentucky Dam downstream 10.4 miles is Outstanding Resource Water due to the presence of federally endangered orangefoot pimpleback mussel (*Plethobasus cooperianus*), pink mussel (*Obovaria retusa*) and pink mucket mussel (*Lampsilis abrupta*). There are 17 active KPDES permits recorded for this hydrologic unit.

Land cover/land use. On the eastern side of the river agricultural production of row crops and poultry is common. There are deciduous forest areas along the steeper slopes and narrow ridges. On the western side of the river around Calvert City the land is used heavily for industrial purposes. Around Reidland the land is a mix of residential and commercial. There are 5 active state Superfund sites in the watershed (mostly Coast Guard stations). There are 2 small surface mine quarries in the watershed.

Agency Data Assessment. During the 2000 water quality assessment the main stem of the Tennessee River was assessed for 5.8 miles upstream of the mouth of the Clarks River. This segment was assessed for water quality parameters and was judged fully supporting for aquatic life. A 7.5-mile segment below Kentucky Dam was assessed for fish and was judged fully supporting for aquatic life.

- A 1.0-mile segment of Little White Oak Creek was assessed using water quality and fecal coliform bacteria from Discharge Monitoring Reports (DMR) from Oak View Nursing Home. This segment was judged partially supporting for aquatic life and primary contact recreation.
- A 2.6-mile segment of Guess Creek from the mouth to Dry Creek was assessed for fish and macroinvertebrates. This segment was judged partially supporting for aquatic life.

Watershed Ranking. The data-driven ranking process for the 4 Rivers region unit indicated the watershed as an overall high priority with a very high need for protection. The need for protection is due to the entire watershed being located in the Paducah Source Water Protection Area. The watershed also ranks high for potential impacts due to a very high number of KPDES permits and associated violations. The watershed also has a fairly high toxic release inventory score.

For more info about the KY Watershed Initiative, or for more info about each basin, go to <http://www.watersheds.ky.gov/Default.htm>. At this site you can also link to a watershed viewer that offers narratives containing basic info such as land use, geography, permits, etc. for each HUC 11.